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The Nature Conservancy

Protecting nature. Preserving life.™

PRESCRIBED FIRE

TACTICS AND

IGNITION

TECHNIQUES

Virginia Department of Forestry

Protecting and developing healthy, sustainable forest resources

Unit Objectives

- Discuss tactical considerations when planning and implementing ignitions during a prescribed fire
- Identify basic firing techniques and understand their relationship to meeting prescribed fire objectives
- Identify problems that may adversely affect prescribed fire operations

TACTICAL CONSIDERATIONS

- Timing
  - enough time must be available to complete the operation (not just burn, but mop-up, etc)
  - conditions must be within prescription
  - ignition should be implemented in a planned sequence
  - monitor constantly to see if burn is progressing as planned

- Current and expected fire behavior
  - fuels (model vs actual vs expected)
  - weather (expected vs actual)
  - topography

- Location of Control Lines
  - Topography
    - slope
    - aspect
    - position on slope
    - utilize natural barriers to fire

- Anchor points
  - the key to coordinating a safe operation
  - ensure that no personnel can be outflanked by fire

- Ignition and Holding Equipment
  - choice may be dictated by fuel types and/or available resources
  - devices vary according to fuel types and geographical parts of the country

Ignition Method


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Holding Equipment ?


RANGER

- Safety Zones and Escape Routes
  - must be **pre-designated**
  - marked
  - everyone must know where they are
  - these may change as the ignition operation changes

- Project Organization
  - resources assigned (type and number)
  - size of the burn area
  - resources at risk
  - burn complexity
    - fire behavior
    - terrain
    - weather

- Organization (continued)
  - span of control (less is usually better) 1 to 5
  - ignition sequence (***this may change as conditions change)***
  - assignments
    - ignition crew
    - holding crew
    - logistics/ other

- Organization (continued)
  - communications
    - ignition boss must have contact with firing personnel at all times
    - may need to stop or modify operation dependent upon conditions
    - **must** maintain communication with and know what all personnel in the operation are currently doing

TYPES OF FIRE SPREAD

Fast

Slow

HEAD FIRE

BACKING FIRE

Flank Fire

Buffer Strip
Plow Line
WIND
Creek
Road
Control Line
Firelane
Wind Direction
Burn Direction
Burn Direction
Burn Direction
Line of fire
Burned Area
Burned Area

IGNITION TECHNIQUES

- THERE ARE 5 PRIMARY IGNITION TECHNIQUES:
  - backing fire
  - strip firing
  - spot or point source ignitions
  - ring firing
  - chevron firing

BACKING FIRE

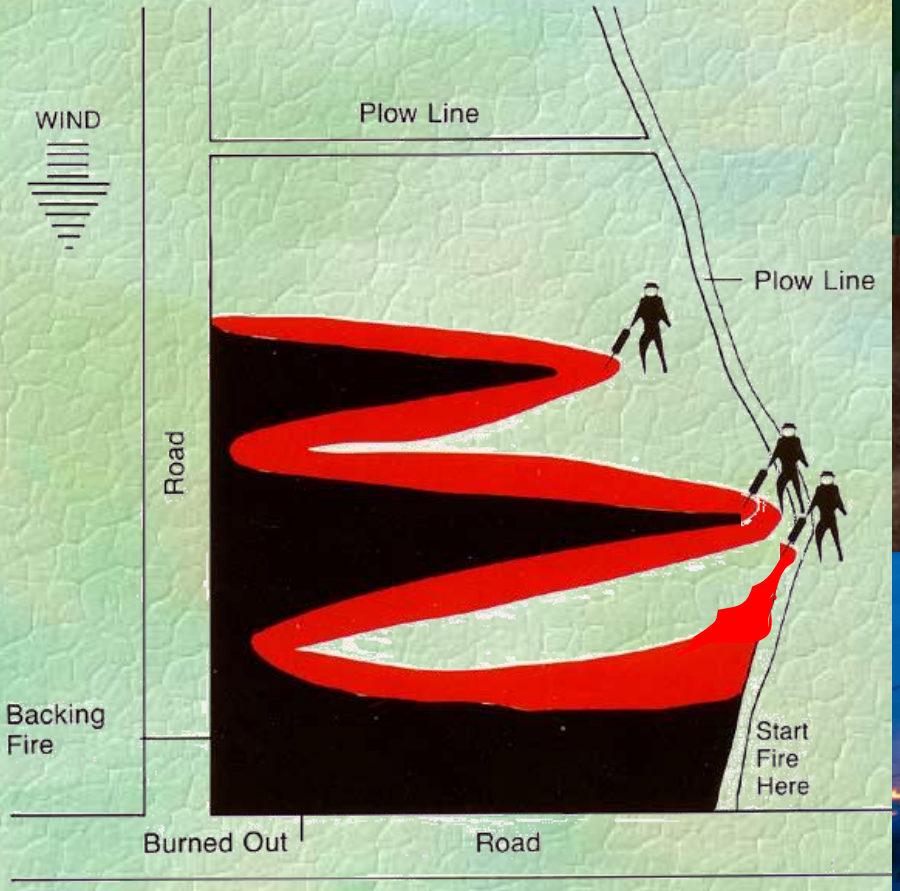
TACTICAL CONSIDERATIONS

- Safe and effective in many fuel situations
- Less smoke production
- Takes lots of time!
- More heat produced at lower levels of duff and sub-surface…can damage feeder-roots if moisture is insufficient
- Less heat transferred to crowns
- Must have relatively continuous fuels

TACTICAL CONSIDERATIONS

- Variations in windspeed have little effect on ROS (1-3 CH/HR)
- Easiest and safest (provided wind direction remains constant)
- Produces minimum scorch
- Works well in heavy fuels
- Consumes more fuel than other patterns

STRIP FIRING

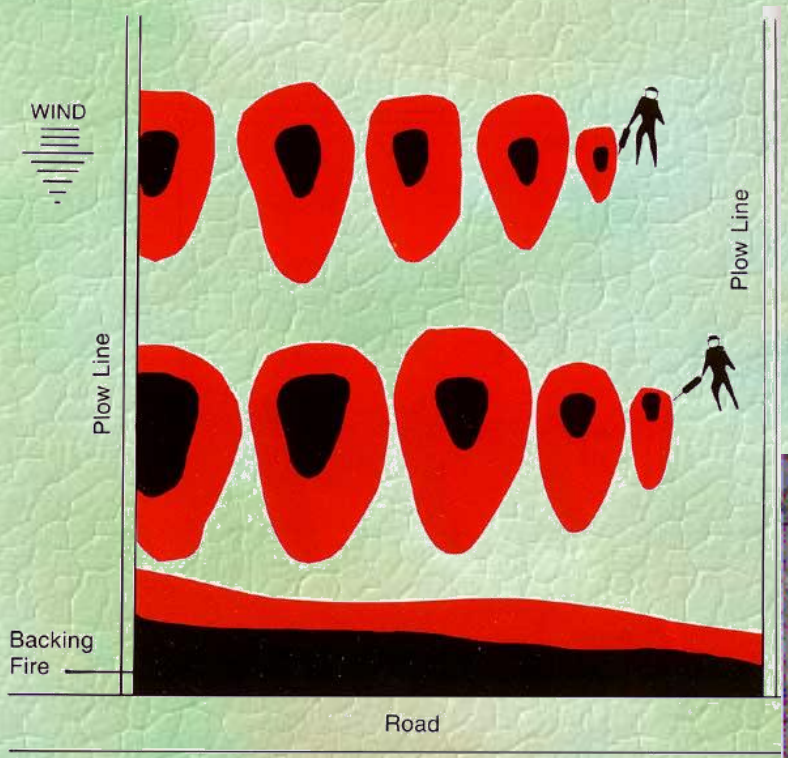


TACTICAL CONSIDERATIONS

- Most commonly used technique
- Set an ignition along a strip of fuel and allowing the strips to burn together
- Width of strips regulates fire intensity
- More strips means faster area ignition
- Width of strips varies relative intensity
- Faster than a backing fire

TACTICAL CONSIDERATIONS

- Can consume large areas in a shorter period of time
- Burns effectively at high relative humidities and/ or fuel moistures



SPOT FIRING

Point-source Ignitions

TACTICAL CONSIDERATIONS

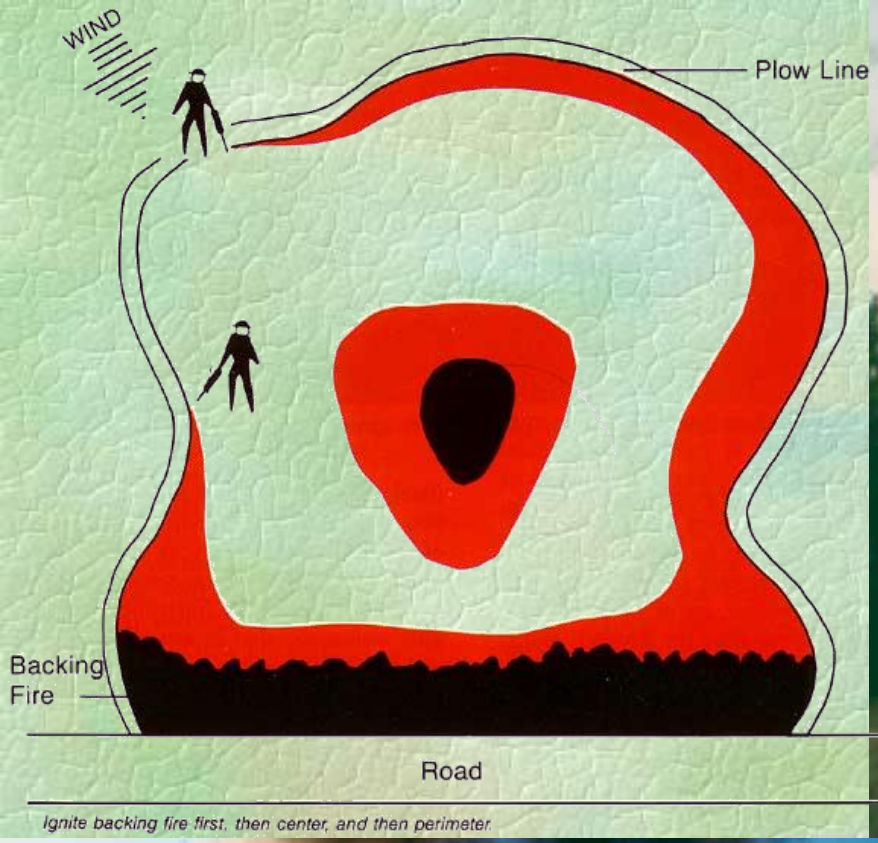
- Often used in conjunction with strip firing
- Utilizes a series of small spot ignitions that burn together, **minimizing** the possibility that any one spot will gain sufficient momentum to start a hot run.
- Timing and spacing of spots is the key to successful application of this technique

TACTICAL CONSIDERATIONS

- Conserves Fuel
- Susceptible to development of hot spots if the spot fires are incorrectly spaced
  - closer together = less intensity
  - further apart = greater intensity

TACTICAL CONSIDERATIONS

- May allow fast ignition
- Allows for the elimination of pockets of heavy fuels when fine fuel moistures are high
- Entrapment potential is increased in light fuels
- Crown scorch is increased



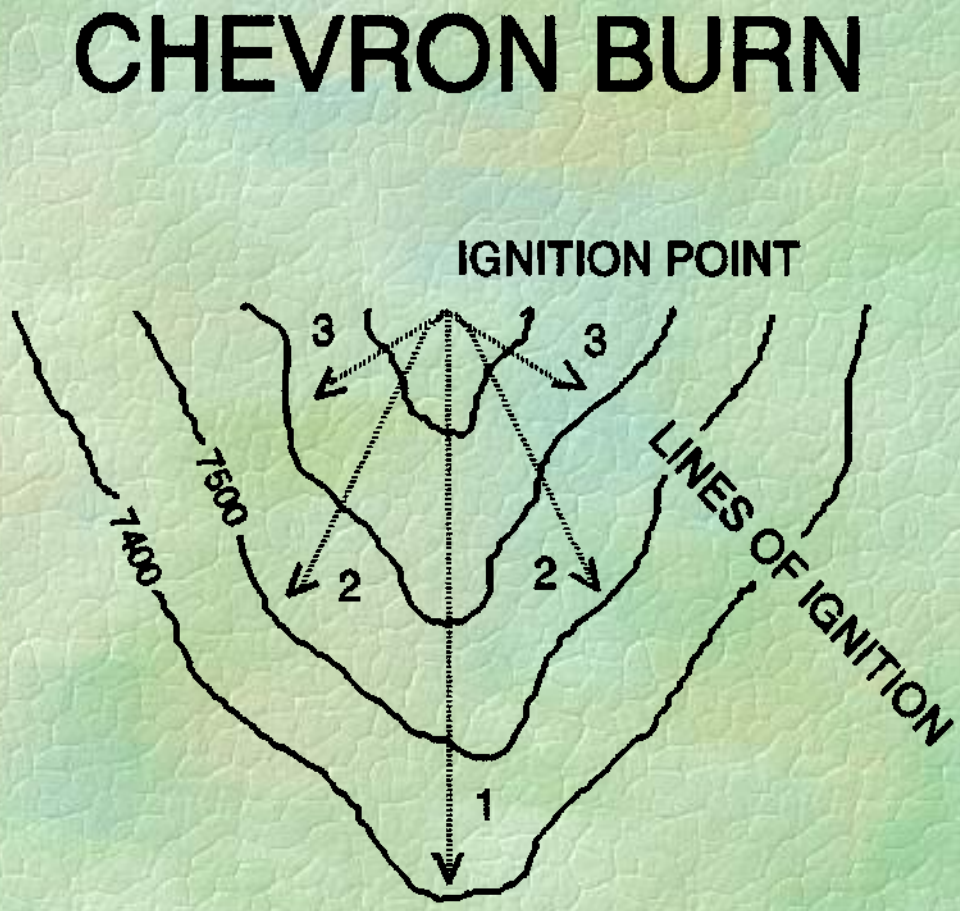
Ignite backing fire first, then center, and then perimeter.

RING FIRING

TACTICAL CONSIDERATIONS

- Circling the perimeter of an area with a control line and then firing the entire perimeter
- Useful in burning around structures/ archeological sites/ endangered species
- Escape routes and safety zones are **critical** in this technique

CHEVRON FIRING



TACTICAL CONSIDERATIONS

- Utilized in specialized situations usually involving terrain features
- Establishes a line of fire in a v-shaped pattern to burn off ridge points or ends. Burn progression must be downhill

HAZARD IDENTIFICATION RELATING TO FIRING OPERATIONS

- Changes in wind speed and/ or direction
- Spotting
- Potential entrapment of personnel
- Rolling material
- Fire Intensity (unexpected)

REMEMBER!

ALWAYS FIRE FROM AN ESTABLISHED ANCHOR-POINT!

MARGINAL CONDITIONS

- Winds
- Steep slopes/ mid slopes
- V-shaped canyons/ hollows
- Saddles and ravines
- Expected fire behavior does ***not*** occur

FIRING UNDER MARGINAL CONDITIONS

Ask yourself... Should we be burning if I am on the “edge” of the prescription?

REMEMBER!

The public, as well as your agency and other cooperators, expects that all prescribed fire operations be undertaken in a conscientious and professional manner. Detractors are easy to find, so ensure that all aspects of the prescribed fire operation, from initial planning through post-fire analysis, are complete and thorough.

Sometimes things don’t work out as planned!!!

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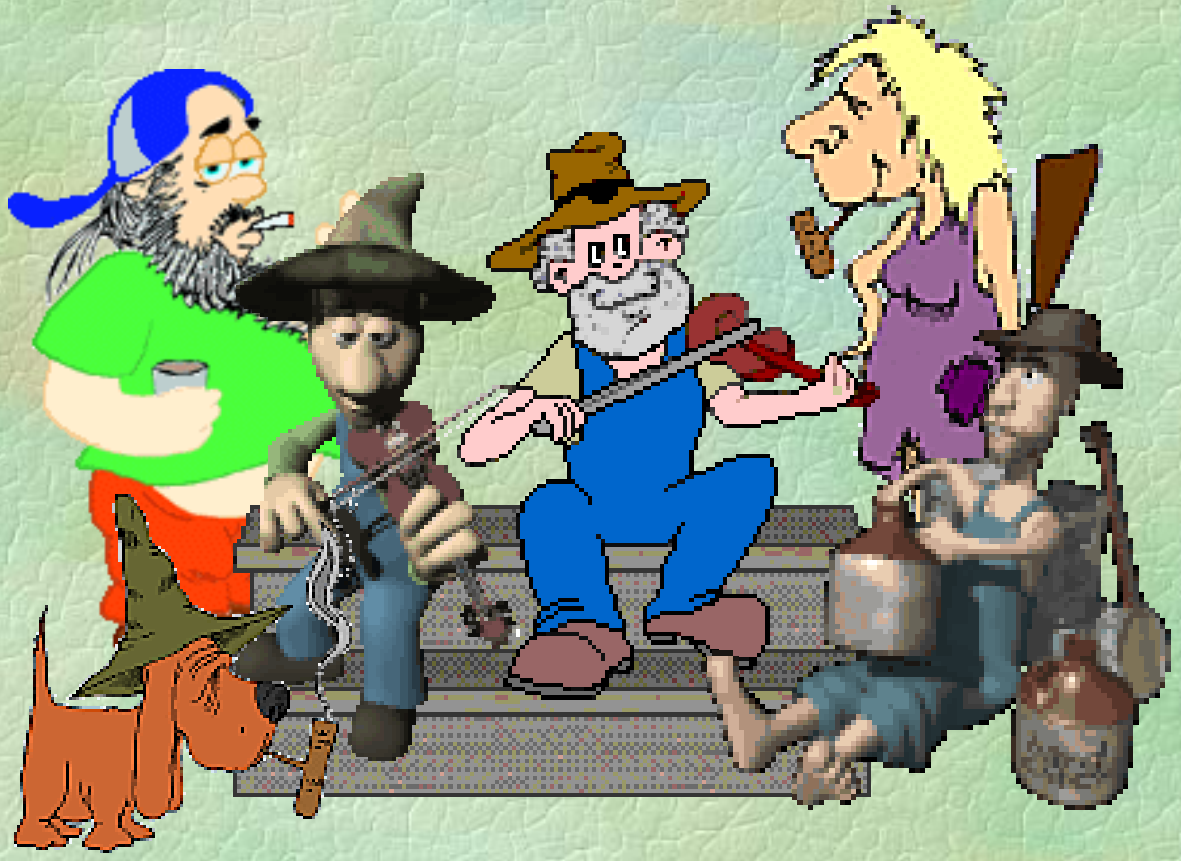

Thank You!

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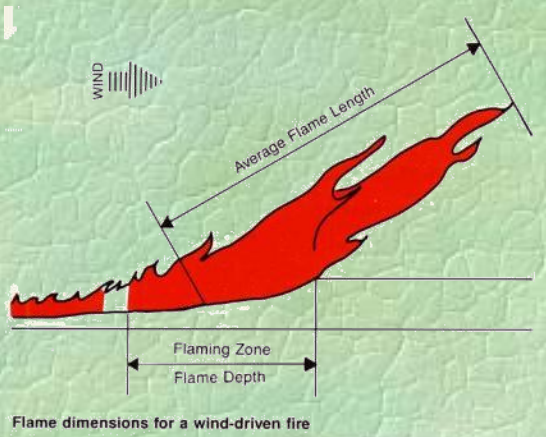
PRESCRIBED FIRE EXERCISE



Flame dimensions for a wind-driven fire